

NATURAL COMPOUNDS AND STRUCTURED BIOLOGICAL SYSTEMS IN PREVENTION AND ADJUVANT THERAPY OF INFECTIOUS DISEASES OF PIGS

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Abstract

Presently, when it is not allowed to use antibiotic growth stimulators, the production of pigs has to search for new strategies, especially in the prevention of infectious diseases. The application of natural substances and some microorganisms seems to be a feasible alternative. As these agents do not reach the potency of chemical drugs that have commonly been used previously, it is necessary to develop complex regimes combining various agents with sequential biological effects (adaptogens, antioxidants and scavengers of free radicals and other reactive species (RNOS), anti-inflammatory agents, immunomodulators, antimicrobial substances and synbiotics). Combinations of some substances from the above mentioned classes often exhibit synergistic effects. It makes it possible to reduce doses in complementary mixtures and thus limit the risks of negative influence on feed and food chain. Using natural products as anti-invasive agents is advantageous due to the fact that they rarely induce resistance. Based on the reported data it can be concluded:

The research of antimicrobial agents applicable for non-therapeutic purposes has been intensive, but only approx. 10% of the reported agents (summary standardized extracts, fractions or pure substances) are suitable for practical usage.

Pharmaceutical microbiology intensifies the research of suitable bacteria (*Lactobacillus*, *Enterococcus* etc.) in view of producing peptides capable to physiologically substitute classical antibiotics.

It seems highly probable that animal proteins of milk and some of their degradation products will play an important role.

Plants will serve not only as a source of usable metabolites but also as a material for genetic manipulations (introduction of genes encoding expression of animal peptides into the plant cells).

Important antimicrobial effects were observed with monoterpenes alone or in a combination with sesquiterpenes (sesquiterpenic lactones). Using complex volatile oils is better than using pure isolated compounds since the effects of individual components are additive or synergistic, and volatile oils have broader antimicrobial spectra.

Synergizing the effects is essential since low-molecular anti-invasive agents (small molecules can not be introduced into the feed chain in therapeutic concentrations).

Metabolic differences of individual animal species must be taken in account. Only if possible metabolic processes are considered a natural compound or a mixture can be applied in an optimal dose.

The dose must be also optimized in view of utilizing nutrients in the feed. For many natural additives, such as tannins, catechins, procyanidins, anti-nutrition effects have not been proven so far. Nonetheless, this aspect requires further studies.

Furthermore, additives and their metabolites should not negatively influence the appearance, taste and flavour of final products.

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